OCR AS Computer Science
Component 1: Computing Principles (H046/01)

Practice Exam 2

Time: 1 hour 15 minutes

Instructions
- Do not use a calculator.

Information
- The marks for questions are shown in brackets [ ].
- The maximum mark for this paper is 70.
- Quality of extended responses will be assessed in questions marked with an asterisk (*).

Questions

1 Modern processors with the Von Neumann Architecture use the fetch-execute cycle to execute programs.

(a) Explain what is meant by the Von Neumann Architecture. **[2]**

(b)* Explain the process of the fetch-execute cycle. **[9]**

2* Modern computer systems can contain HDD, SSD and CD/DVD drives. Compare the similarities and differences of these three types of drive, explaining the advantages of each. Include how they store data. **[9]**

3 Modern computers use different types of software, including operating systems, utilities and applications.

(a) State the purpose of each type and give an example use:

(i) Operating System **[2]**

(ii) Utility software **[2]**

(iii) Application software **[2]**

(b) State the most appropriate generic software application for each task:

(i) Writing a letter to your bank for printing and sending in the post. **[1]**

(ii) Creating a magazine front cover. **[1]**

(iii) Presenting information to an audience. **[1]**

(iv) Analysing monthly sales figures for a company. **[1]**

(v) Storing customer details for a company. **[1]**

(vi) Brightening a photograph stored as a digital file. **[1]**

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4 Consider the following program code:

```
procedure main()
  Var1 = 5
  Var2 = 10
  Var3 = ABCD( Var1, Var2 )
  Print( "Output 1= "+Var1)
  Print( "Output 2= "+Var2)
  Print( "Output 3= "+Var3)
endprocedure

function ABCD(x:byVal, y:byRef)
  for i=0 to x
    y = y + 1
  next i
  x = 2
  return x
endfunction
```

(a) Describe the difference between a function and a procedure. **[1]**

(b) The program code uses parameters and arguments.

(i) State what is meant by a parameter. **[1]**

(ii) Give an example of a (formal) parameter used with the function ABCD. **[1]**

(iii) Give an example of an argument, sometimes called an actual parameter, used with the function ABCD. **[1]**

(b) Describe one difference between byVal and byRef parameters. **[1]**

(d) Give the output of the procedure main () **[1]**

(i) Output 1 **[1]**

(ii) Output 2 **[1]**

(iii) Output 3 **[1]**

(e) The function ABCD is inefficient. Describe two ways that this code is inefficient and in each case suggest alternative code that is more efficient.

(i) Inefficiency 1: **[1]**

(ii) Alternative code: **[1]**

(iii) Inefficiency 2: **[1]**

(iv) Alternative code: **[1]**

5 A music company sells many albums and wants to create a database that stores this information:

- Each album has one contract between the artist and music company.
- Each album contains several music tracks.
- Each music track only features one artist.
- Music tracks can be featured on more than one album.
- Each album can contain music tracks by one artist or can be a compilation featuring music tracks from many artists.

Describe the relationship between the following entities:

(i) Music company, album **[1]**

(ii) Album, contract **[1]**

(iii) Album, music track **[1]**

(iv) Artist, music track **[1]**

(a) The relationship between artist and album is many-to-many. Describe how a many-to-many relationship might be altered to become a one-to-many relationship. **[2]**

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6 Websites use different technologies to achieve specific purposes.

(a) Describe the difference between the Internet and the World Wide Web. **[2]**

(b) State the purpose of each computer language for a webpage:

(i) HTML **[1]**

(ii) CSS **[1]**

(iii) JavaScript **[1]**

(c) There are many different image file formats in use on the World Wide Web. Some image file formats use lossy compression and some use lossless compression.

(i) Describe what is meant by file compression. **[2]**

(ii) Name an image format that uses **lossy** compression. **[1]**

(iii) Name an image format that uses **lossless** compression. **[1]**

(iv) Describe two advantages of **lossy** compression. **[1]**

(v) Describe two disadvantages of **lossy** compression. **[1]**

7 Tuples, lists, stacks and queues are different data structures used to represent data in a computer program.

(a) A tuple is a special kind of list. Describe two differences between a list and a tuple. **[2]**

(b) Describe the difference between a stack and a queue. **[2]**

(c) The following operations are performed on a stack:

```
Push 17
Push 23
Push 41
Pop X
Push 52
Pop Y
Pop Z
```

(i) State the value of X. **[1]**

(ii) State the value of Z. **[1]**

(iii) State the problem with performing the following operations on the same stack: **[1]**

```
Pop A
Pop B
```

END OF QUESTIONS

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